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THE UNITED STATES OF AMERICA

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APPLICATION NUMBER: 60/550,466

FILING DATE: *March 05, 2004*

RELATED PCT APPLICATION NUMBER: PCT/US05/07214



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16076 U.S. PTO

030504

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**VIA EXPRESS MAIL**  
EV 378778825 US

Commissioner for Patents  
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Alexandria, VA 22313-1450

Re: Our Docket No. 04100-PPA

**CERTIFICATE OF TRANSMITTAL**  
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: March 5, 2004  
Express Mail No.: EV 378778825 US

By: Diane Panicho  
Diane Panicho

Dear Sir:

Enclosed please find the following:

1. New U.S.A. provisional patent application entitled "FLUID FLOW METER BODY WITH HIGH IMMUNITY TO INLET/OUTLET FLOW DISTURBANCES"; including specification and claims (3 pages), and drawings (3 sheets); KURZ, Inventor.
2. Form PTO/SB/16 duly executed.
3. Our check No. 01524 in the amount of \$80.00 to cover the application filing fee.

22387 U.S. PTO  
60/550466



030504

Commissioner for Patents

-2-

March 5, 2004

4. Our post card. (Please date stamp and return).

**Applicant is a small entity.**

Please address all correspondence to:

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP  
502 Washington Avenue, Suite 220  
Towson, MD 21204

The inventor is:

Jerome L. KURZ  
33 Los Robles Road  
Carmel Valley, CA 93924

He is a citizen of the United States of America.

If there are any additional fees, please charge our Deposit Account No. 02-2839.

Thank you for your cooperation and assistance.

Respectfully submitted,

  
Leonard Bloom

LB/dtp

Enclosures

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EV 378778825 US

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
Jerome L.		KURZ		33 Los Robles Road Carmel Valley, CA 93924	
Additional inventors are being named on the <u>N/A</u> separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
FLUID FLOW METER BODY WITH HIGH IMMUNITY TO INLET/OUTLET FLOW DISTURBANCES					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number: _____					
OR					
<input checked="" type="checkbox"/>	Firm or Individual Name <u>ARMSTRONG, KRATZ, QUINTOS, HANSON &amp; BROOKS, LLP</u>				
Address		502 Washington Avenue			
Address		Suite 220			
City		Towson	State	MD	Zip
Country		U.S.A.	Telephone	410-337-2295	Fax
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/>	Specification Number of Pages <u>3</u>			<input type="checkbox"/>	CD(s), Number _____
<input checked="" type="checkbox"/>	Drawing(s) Number of Sheets <u>3</u>			<input type="checkbox"/>	Other (specify) _____
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/>	Applicant claims small entity status. See 37 CFR 1.27.				
<input checked="" type="checkbox"/>	A check or money order is enclosed to cover the filing fees.				
<input checked="" type="checkbox"/>	The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: <u>02-2839</u>				
<input type="checkbox"/>	Payment by credit card. Form PTO-2038 is attached.				
					FILING FEE Amount (\$)  <u>\$80.00</u>
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/>	No.				
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

[Page 1 of 2]

Respectfully submitted,

SIGNATURE Leonard BloomTYPED or PRINTED NAME Leonard BloomTELEPHONE 410-337-2295Date March 5, 2004REGISTRATION NO. 18,369

(if appropriate)

Docket Number: 04100-PPA

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**UNITED STATES**  
**PROVISIONAL PATENT APPLICATION**

**Title:** FLUID FLOW METER BODY WITH HIGH IMMUNITY  
TO INLET/OUTLET FLOW DISTURBANCES

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## **FLUID FLOW METER BODY WITH HIGH IMMUNITY TO INLET/OUTLET FLOW DISTURBANCES**

The present invention deals with the age-old flow measurement accuracy and repeatability problems caused by Flow Meter Body upstream and/or downstream flow disturbances, such as elbows, line size changes, valves and other flow obstructions. This invention incorporates the exceptional fluid velocity profile flattening properties of Flow Nozzles in combination with Flow Diffusers placed upstream and/or downstream of the Flow Nozzle in order to create immunity to these problems. A Flow Diffuser placed upstream of the Flow Nozzle is used to decelerate the fluid velocity thereby allowing the fluid to expand, flow through the Flow Nozzle and present a repeatable, invariant, flat velocity profile to the Flow Sensor located in the Flow Measurement Section downstream of the Flow Nozzle. The upstream Flow Diffuser also allows the user to match the Flow Meter Body inlet to a smaller inlet pipe than the Nozzle Inlet Section and avoids the common problem of turbulence generation and static pressure loss caused by field welding and fabrication of adapters. A Flow Diffuser placed downstream of the Flow Measurement Section and Flow Nozzle is used to recover a large percent of the pressure drop across the Flow Nozzle, thus reducing the pressure drop through the Flow Meter Body. This invention provides a Flow Meter Body with exceptional immunity to flow disturbances, requires much less upstream and downstream pipe diameters, conveniently mates to a wide range of pipe sizes, eliminates costly field welding and fabrication of pipe adapter fittings and has a very low end-to-end static pressure loss compared to existing Flow Meter Bodies.

**CLAIMS:**

1. A Fluid Flow Meter Body incorporating a Flow Nozzle and Flow Diffusers placed upstream and/or downstream of the Flow Nozzle with a Flow Measurement Section downstream of the Flow Nozzle designed for use with thermal mass flow sensors.
2. Claim 1 in which the flow measurement section is instrumented with any other type of fluid flow sensor (such as Pitot tube, vortex shedder, turbine, sonic, etc.).
3. Claim 1 in which Flow Diffusers are used to adapt to larger or smaller pipeline sizes at either the inlet and/or outlet of the Flow Meter Body.
4. Claim 1 in which the Flow Nozzle has a concentric, converging inlet with a radial, elliptical, bell-mouthing curvature; or any other curvature that provides similar fluid velocity profile flattening properties.
5. Claim 1 in which the Flow Nozzle has an eccentric, converging curvature.
6. Claim 1 in which the Flow Diffusers have a concentric or eccentric shape.
7. A Fluid Flow Meter Body incorporating a Flow Nozzle and Flow Diffusers placed upstream and/or downstream of the Flow Nozzle, with or without a Flow Measurement Section, in which ports are installed upstream and downstream of the Flow Nozzle for the measurement of differential pressure and ports are installed for pressure, temperature for the purpose of measuring the fluid volumetric or mass flow rate for use with conventional flow instrumentation.
8. Claim 7 in which the Flow Nozzle and Flow Diffusers are concentric or eccentric, have radial, elliptical, bell-mouthing or any other curvature that provides adequate velocity profile flattening, etc.

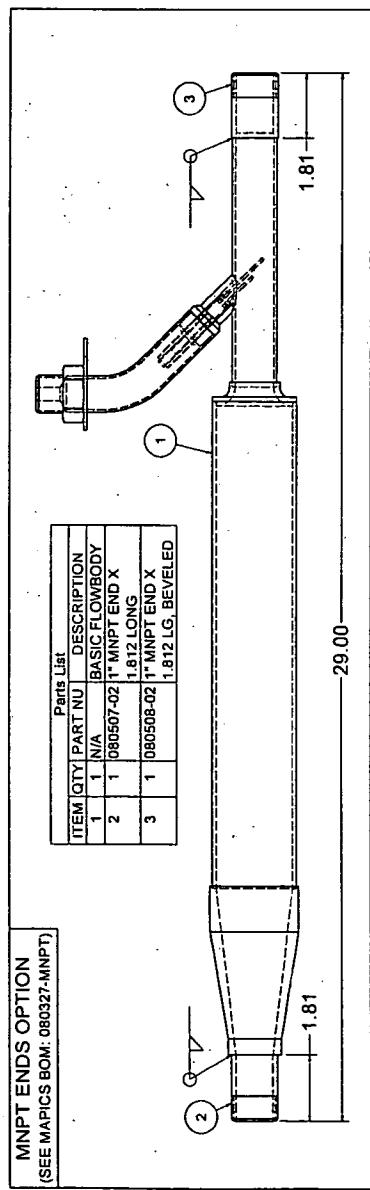
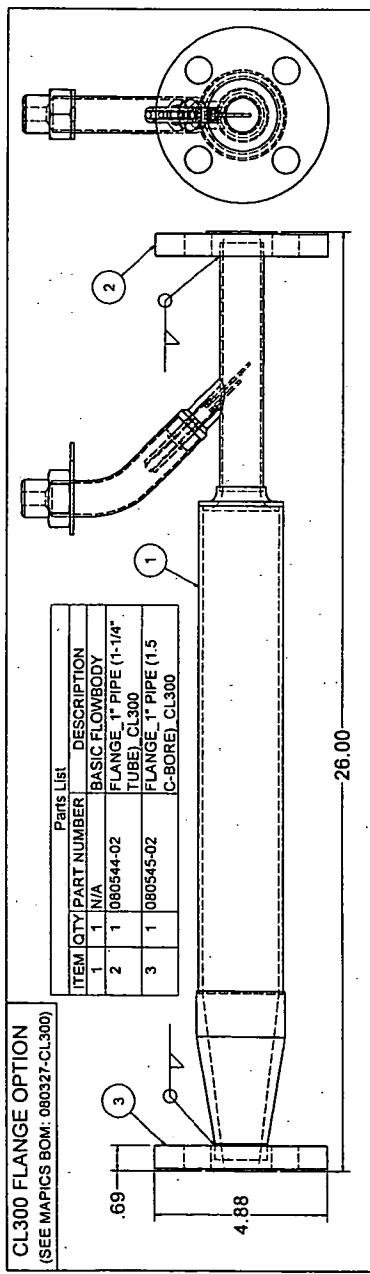
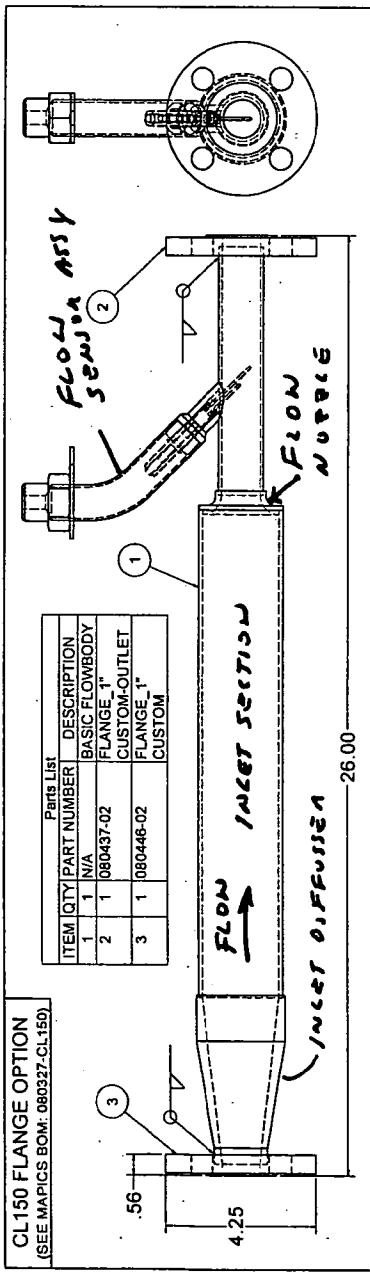
9. Claims 1-8 in which a Flow Diffuser is used to provide the user with several sizes of inlet pipe fittings without affecting the immunity to inlet/outlet velocity profiles and a Flow Diffuser to recover static pressure and match up to a wide range of outlet pipe fittings.

10. In a flow measurement system, including a flow meter body with a flow nozzle, wherein flow disturbances may occur due to elbows, line size changes, valves and other disturbances upstream and/or downstream in the system, thereby resulting in measurement inaccuracies and/or problems in the repeatability of the measurements, the improvement comprising a flow nozzle in the flow meter body, such that the flow meter body is substantially immune to flow disturbances, accommodates smaller or larger pipe diameters, eliminates costly fabrication problems in the field, and has a relatively low end-to-end static pressure loss.

11. The improvement of claim 10, wherein the flow diffuser is placed upstream of the flow nozzle, thereby decelerating the fluid velocity and allowing the fluid to expand, flow through the flow nozzle and present a substantially repeatable, invariant, flow velocity profile, as well as provide an adapter to accommodate smaller or larger pipe sizes.

12. The improvement of claim 11, wherein the flow diffuser is placed downstream of the flow nozzle, thereby recovering a substantial portion of the pressure drop across the flow nozzle, and thereby reducing the pressure drop through the flow meter body, as well as providing an efficient method of adapting to smaller or larger pipe sizes.

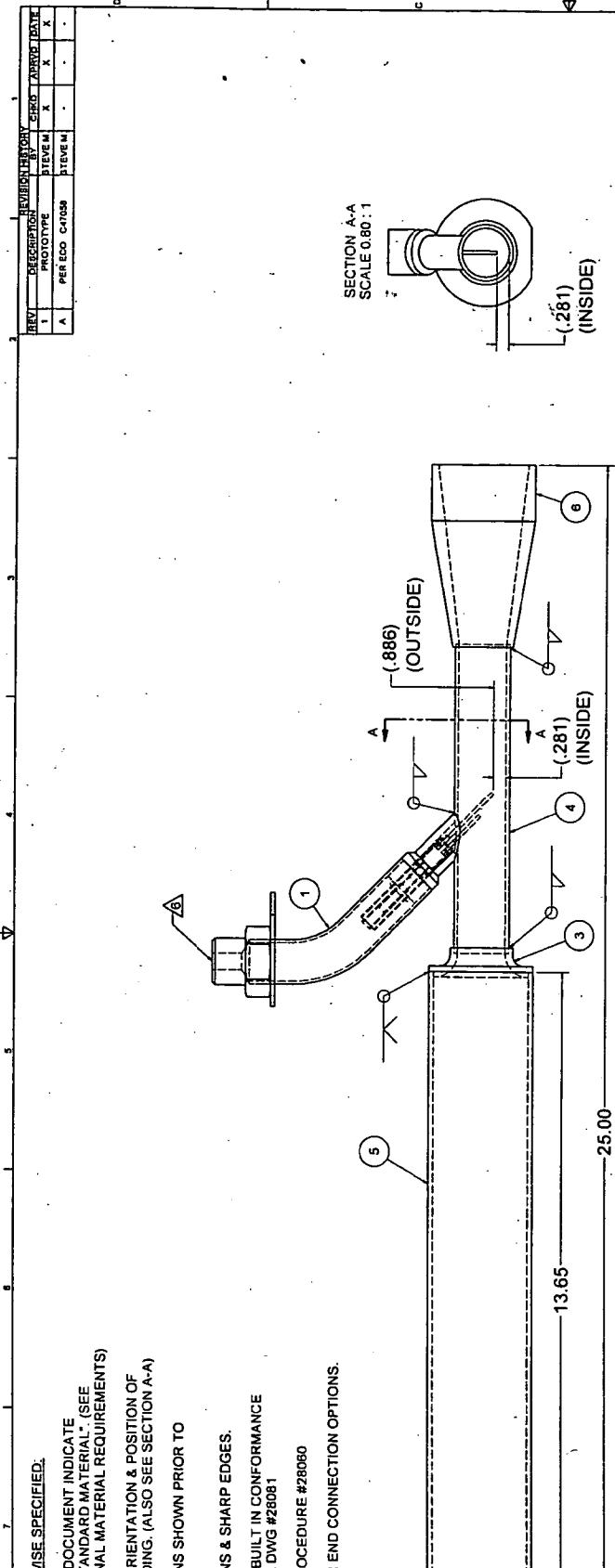
**Fig. 1**



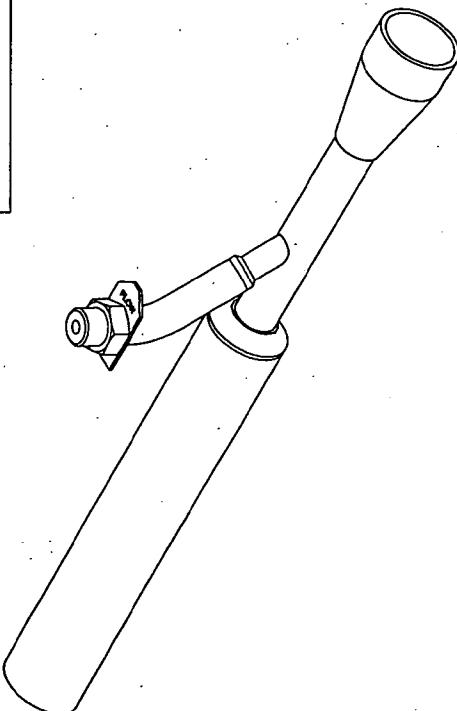
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES		DRAWN SHEET NO.	REV.	KURZ INSTRUMENTS, INC.
ITEM	DATE			
1	APPROVED			
2	DATE			534FT-16A, FB ASSY (ATEX)
3	REISSUE			
4	REVISED			
5	REPLACES			
6	ORIGINAL			
7	DATE			
8	RELEASE DATE			



# Fig. 3



AUXILIARY VIEW



Parts List		ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	080391		ASSY-SENSR.	534FT-18 (ATEX)
2	1	N/A		N/A	
3	1	080435-02		NOZZLE, 16	
4	1	080436-02		FLOW AREA-16_COM	
				MON	
5	1	080443-02		INLET 18C	
6	1	080444-02		DIFFUSER 18C	

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ALL DIMENSIONS ARE IN INCHES  
S. McDERMOTT  
P/C/2001

DATE: 08/03/01  
APPROVED: DATE: 08/03/01  
KURZ INSTRUMENTS, INC.  
534FT-16C, FB ASSY (ATEX)  
REV: D DATE: 08/03/01  
ORIG. RELEASE DATE: 08/03/01  
SHEET 1 OF 1